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Total Market Return for Determining the Cost of Equity at RIIO-2

By **Dr Richard Hern**, **James Grayburn**, and **Zuzana Janeckova**

Overview

National Grid commissioned NERA Economic Consulting (NERA) to consider the evidence for the total market return (TMR) for determining the cost of equity at RIIO-2.

In this short report, we set out up-to-date estimates of the TMR based on long run historical averages, as well as forward looking evidence based on dividend discount models (DDM), and consider the relative merits of these two approaches in determining the allowed cost of equity. We also respond to recent publications on this topic, including comments in Ofgem's recent RIIO-2 Open letter,[1] and a report by PwC, commissioned by Ofwat, which considered the cost of equity for water companies for PR19 (2020-25).[2]

Overall, we find that estimates of the TMR based on long run historical averages and DDM have not declined relative to previous price control reviews, and therefore do not support a decline in the allowed cost of equity relative to RIIO-1, in contrast to Ofgem's and Ofwat's recent statements suggesting a lower cost of equity for the forthcoming price controls.[3]

All GB regulators have adopted a CAPM-TMR approach to determining the cost of equity

Ofgem, along with all other GB regulators, use the capital asset pricing model (CAPM) to estimate the cost of equity, sense checked against other approaches.[4] The familiar CAPM can be written as:

$$(1) \quad Ri = RfR + \beta i * ERP,$$

Where Ri is the expected return on equity; βi is the equity beta which measures the systematic risk of the equity of the regulated firm; RfR is the risk free rate; and ERP

is the equity risk premium which is equal to the TMR minus the RfR. Equation 1 can therefore be re-stated as:

(2) $Ri = (1-\beta i)*RfR + \beta i*TMR$

As can be seen from equation (2), in the CAPM, the expected return on equity can be expressed as a weighted average of the RfR and the TMR with the weights depending on the equity beta. Where the equity beta is close to 1, or the average for the market, (as is the case for energy networks),[5] the weight on the RfR is low and the far greater the weight rests on the TMR. As a consequence, Mason, Miles and Wright, academics that advised GB regulators at previous reviews, noted that the focus of GB regulators should be on estimating the TMR given its dominance in the determination of the cost of equity for regulated networks. They also noted that this is fortunate, as there is far greater certainty over the value of the TMR, and far less certainty about the true historical risk free rate and by implication the ERP, which have demonstrated far greater volatility over time.[6]

Most GB regulators, as well as the Competition and Markets Authority (CMA), have focussed on the estimation of the TMR in determining the allowed return on equity, as opposed to estimating the ERP directly.[7] The CMA explained that its reason for adopting such an approach is that it provides more stable estimates:[8]

> *"Our preferred approach is to deduct our estimate of the RFR from our estimate of the equity market return [TMR] to derive the ERP. [...] the market return has tended to be less volatile than the ERP [...], and there is some evidence of the ERP being negatively correlated with Treasury bill rates over the short term."*

PwC, Ofwat's advisers for PR19, also have a "*methodological preference for focussing on the TMR as a primary assumption*", given "*its relative stability*".[9]

There are two principal approaches to estimating the TMR: long run historical averages or forward looking evidence based on DDM

The most common approach to estimating the TMR is to draw on *realised* historical returns. This approach assumes that historical realised returns provide an unbiased estimate of the *expected* return over long time periods, given that the impact of expectational errors should cancel out over long time frames. An alternative approach is to draw on current or forward looking data, such as the dividend discount model (DDM, also referred to as the dividend growth model, DGM). At recent price controls, Ofgem as well as other regulators (including the CMA) have tended to focus on long run historical estimates, with the DDM employed as a cross-check on the results derived from long run averages.[10]

The weight of evidence supports negative correlation of ERP and RfR, and a constant TMR over time

The argument for adopting a long run approach depends on whether the expected TMR is broadly constant over time, and thus whether historical returns provide an unbiased measure of the expected future return. Given the marked historical volatility in the RfR (see for example, Figure 1), the constancy of the TMR depends on whether these observed variations in the RfR are broadly off-set by changes in

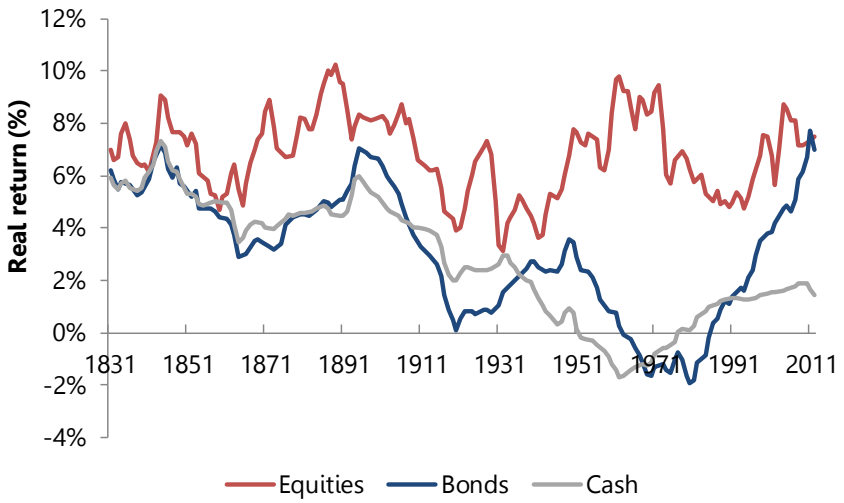
the ERP, that is, whether ERP and RfR negatively co-vary over time. In general, as we discuss below, financial literature supports the negative co-variance of the RfR and ERP over time, and the time constancy of the TMR.

Financial literature explains that the negative correlation between RfR and ERP is associated with the increase of risk aversion and associated "flight-to-safety" during periods of economic and financial crisis. In times of heightened market volatility investors dispose of risky assets such as equity, which increases the required return for holding stocks and hence the ERP, and use the proceeds to buy risk-free assets such as government bonds, which reduces the yield of risk free assets, resulting in the negative relationship between the two variables.[11]

Empirically, a number of studies find a positive relationship between volatility and expected returns and a negative relationship between RfR and ERP while the TMR exhibits a stable mean over time, implying that over long timeframes the ERP and RfR have moved point-by-point in opposite directions.[12] As an example, some of the most compelling evidence is provided by Siegel (1998), who analysed 200 years of US stock market data, which shows a remarkable degree of stability in equity returns over time, in contrast to other asset classes (such as the risk-free rate):[13]

> *"the growth of purchasing power in equities not only dominates all other assets but is remarkable for its long-term stability. [...] This remarkable stability of long-term real returns is a characteristic of mean reversion, a property of a variable to offset its short-term fluctuations so as to produce far more stable long-term returns. [...] As stable as the long-term real returns have been for equities, the* ***same cannot be said of fixed-income assets."***

Figure 1. **US stock market returns show "a remarkable degree of stability" over time (30 year rolling averages for period 1801 -2012)**

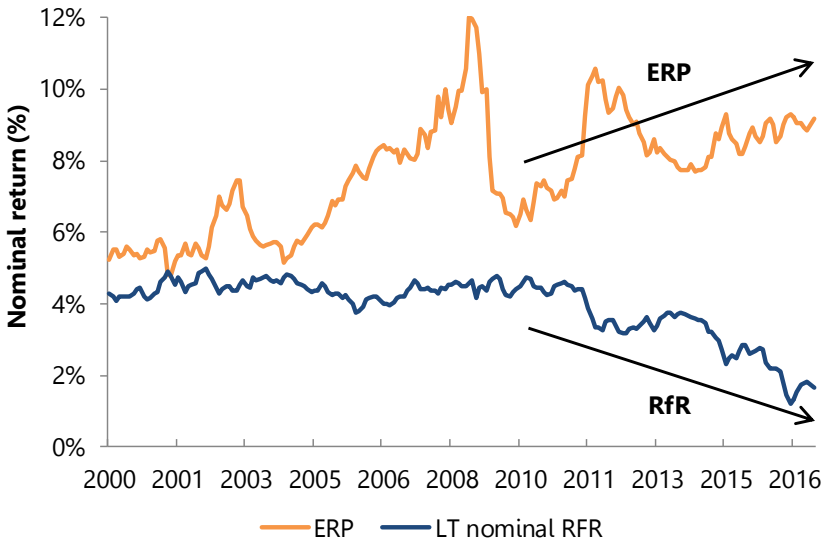


Source: Siegel (1998) for the period 1801 to 1899 then updated by DMS. See: Wright and Smithers (2014), The cost of equity capital for regulated companies: a review for Ofgem.

In addition, prominent economic institutions, such as the Bank of England, have recognised that the recent low interest rates and economic uncertainty have led to

increased ERPs.[14] Indeed, the Bank of England's own estimates of the ERP, as derived from its DDM model, have increased markedly with the recent fall in interest rates (see Figure 2).

Figure 2. **Bank of England DDM supports theory that reduction in RFR offset by increases in ERP over recent period**



Source: NERA analysis of Bank of England data

The German Bundesbank has also noted in its monthly reports that there is a strong negative correlation between ERP and risk free rates:[15]

> *"[…] the correlation between returns from stocks and long-term government bonds is a suitable measure of risk aversion… In times of heightened risk aversion, it is therefore often possible to observe that investors demand higher equity risk premiums or undertake shifts from stocks into secure government bonds (safe haven flows). The resulting contrasting price developments of stocks and government securities are accompanied by a negative correlation."*

Evidence from long run realised returns does not support a decline in TMR relative to previous reviews

The constancy of the TMR over time supports the use of long run historical averages to estimate the expected TMR. In its 2014 NIE determination, the CMA used the DMS and Barclays databases as the basis for its long run historical estimate. Drawing on a number of different measures differentiated by holding period and averaging technique (as replicated in Table 1 below), the CMA concluded on a TMR of around 6 to 7 per cent for UK and world markets in 2014.[16]

Updating the CMA analysis based on DMS data up to 2016, our analysis shows that the long run historical averages have increased relative to the estimates presented by the CMA in its 2014 NIE determination by 30 bps on average (depending on the estimate), as shown in Table 1 below (changes circled in green).

Table 1. **DMS long run historical returns have increased by 30 bps since CMA NIE decision (%real RPI returns)**

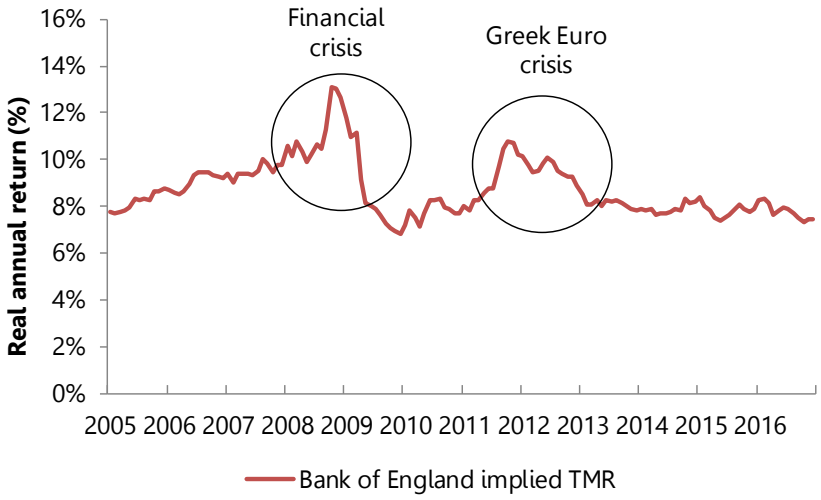
	Simple	Overlapping	Blume	JKM
1Y holding	7.3 (+0.2↑)	7.3 (+0.2↑)	7.3 (+0.2↑)	7.3 (+0.3↑)
2Y holding	7.7 (+0.2↑)	7.2 (+0.2↑)	7.3 (+0.2↑)	7.3 (+0.3↑)
5Y holding	7.4 (+0.7↑)	7.0 (+0.2↑)	7.2 (+0.2↑)	7.1 (+0.3↑)
10Y holding	6.8 (+0.4↑)	6.9 (+0.1↑)	7.1 (+0.2↑)	6.9 (+0.3↑)
20Y holding	7.9 (+1.2↑)	7.0 (+0.1↑)	7.0 (+0.2↑)	6.4 (+0.3↑)

Source: NERA calculations using DMS (February 2017),Credit Suisse Global Investment Returns Yearbook 2017, CMA (2014), Northern Ireland Electricity price determination, Final Determination, p. 13-27, Table 13.7.[17]
Note: The figures in black in the table represent different historical estimates considered by the CMA for NIE (2014), calculated using updated DMS data up to 2016. The figures circled in green represent the difference between the updated estimates and the estimates presented by the CMA in NIE (2014). On average, the updated estimates are higher by 30 bps.

Independent forward looking estimates of the TMR do not support a reduction relative to previous reviews

Although we have a preference for the use of long run historical averages to estimate the TMR, in common with GB regulatory practice at recent reviews, we consider that forward looking evidence from DDM has a role to play as a cross-check. At previous reviews, the CMA has drawn on TMR estimates from the Bank of England's DDM. Recent evidence from the Bank of England supports a TMR of between 7.1 and 8.2 per cent depending on the time period chosen, as shown in Figure 3.[18] Similarly, independent estimates from Bloomberg support a TMR in the range of 7.4 to 7.8 per cent.[19]

Figure 3. **TMR estimates from Bank of England and Bloomberg DDM support a "current" TMR of around 7 to 8 per cent (% real RPI returns)**



	Dec 2016 (spot)	Dec 2016 (5Y average)
Bank of England *	7.1	8.2
Bloomberg	7.8	7.4

Source: Bloomberg, Bank of England (2017), An improved model for understanding equity prices, Quarterly Bulletin 2017Q2, p.94.
Note:* The Bank of England estimates the DDM using a time varying risk-free rate for all maturities (where available) and a long run risk-free rate assumption. We calculate a TMR as the sum of the Bank of England's reported ERP and (i) the average of the real risk-free rate for all available maturities, and (2) the real risk-free rate at the longest maturity available. In the chart, we show the results using the long run risk-free rate assumption with the full range based on both approaches presented in the table under the chart.

PwC considers that the expected TMR has declined, based on a short time-frame and selective evidence on realised returns

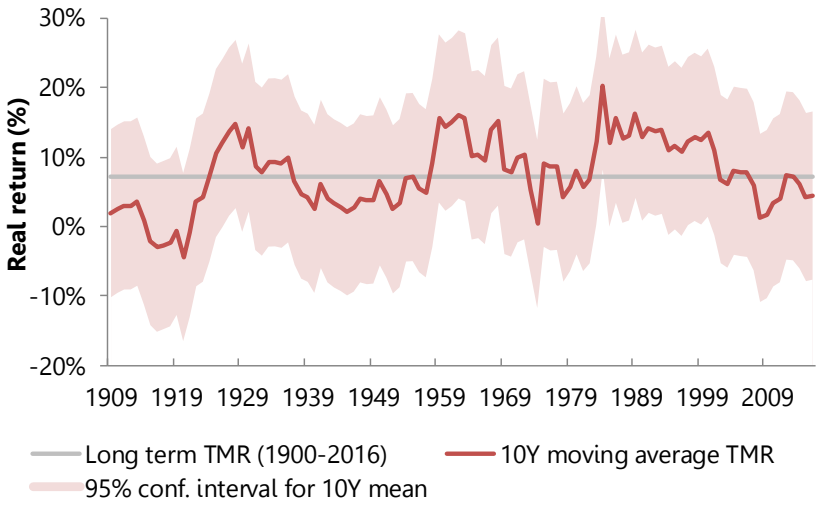
In its recent report for Ofwat, PwC argues that the current low risk-free rate environment, which PwC expects to prevail over 2020-25, implies a reduction in the *expected* total market return, as supported by evidence on reductions in recent *realised* returns for the UK equity market. Based on this assertion, PwC concludes that long term historical data is inappropriate for estimating the TMR in the current market environment, because it is too slow to react to short term dynamics. Instead, PwC recommends to estimate the TMR drawing on "current" approaches, such as the application of the dividend discount model or market-to-asset ratios (MAR). Based on its application of the "current" approaches, PwC estimates a real (RPI) TMR between 5.1 and 5.5 per cent, substantially below estimates based on long run historical data of around 7 per cent.[20]

Short term realised returns cannot be relied upon to inform the TMR given the volatility in returns

PwC's case against the use of long run historical averages to estimate the TMR is based on what it considers are "*low equity returns in recent history*".[21] As evidence of such, PwC claims to show a decline in UK realised market returns based on 10, 20 and 30 year moving averages for the period 1980-2015.[22] Similarly, Ofwat claims to present evidence of a decline in UK equity returns based on decadal returns over the period 1966-2015.[23]

However, drawing on the full period of 1900 to 2016, for which DMS data are available for the UK market, the time-series shows that 10-year moving average realised returns are volatile over time as expected, given the substantial volatility in annual returns, and the most recent 10-year average is not statistically different from the long run average of around 7 per cent. (See Figure 4.)[24] It requires a leap-of-faith to draw conclusions from 10-year periods of recent realised returns given the substantial underlying volatility in annual returns and the resulting statistical uncertainty around the 10-year average estimate. DMS make the same point: "*To understand risk and return in capital markets [...] we must examine periods much longer than 20 years because stocks are volatile, with major variation in year-to-year returns. We need long time series to support inferences about stock returns.*"[25]

Figure 4. **There is no trend decline in the 10Y moving average, and the most recent 10Y moving average is not statistically different from the long run average of around 7 per cent (real RPI)**



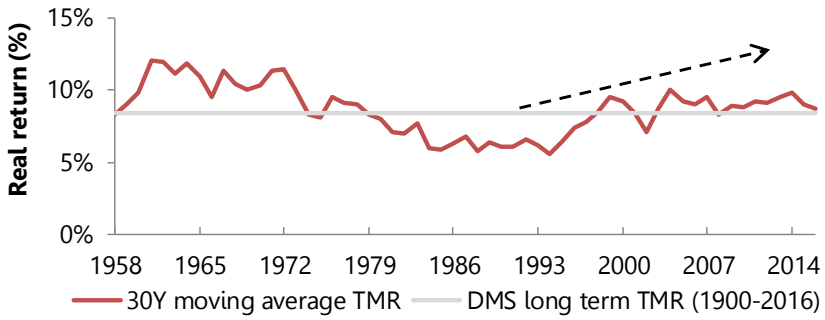
Source: NERA analysis of DMS (February 2017), Credit Suisse Global Investment Returns Yearbook 2017
Note: Confidence interval for the 10-year moving average derived from annual standard deviation calculated over the full sample of 100+ years of data.

In other major equity markets recent realised returns are increasing despite low RfR

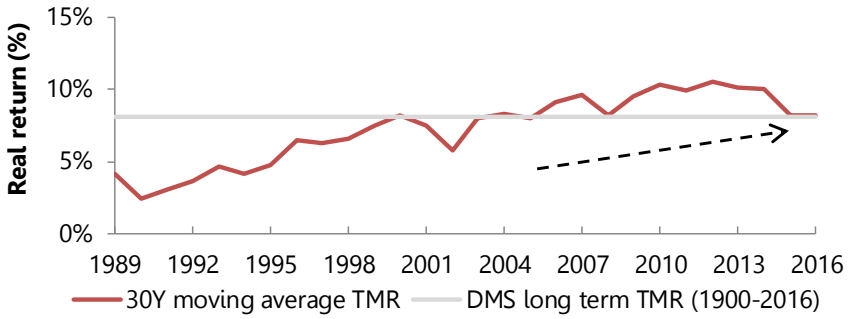
If PwC is correct that equity returns are lower in periods of low interest rates, we would expect to observe a decline in realised equity returns in other major markets, which, like the UK, have enjoyed a prolonged period of low interest rates. In fact, we observe an increase in averages of realised equity returns for both US and Germany (see Figure 5), two of the largest four global equity markets,[26] undermining PwC's assertion that TMR has declined with a declining RfR.[27]

Figure 5. **Other major markets (including US and Germany) show an increase in 30Y moving average returns, contrary to PwC's thesis**

(a) US equity market returns



(b) German equity market returns



Source: NERA analysis based on data from Bloomberg, OECD, US Bureau of Labour Statistics and DMS (February 2017), Credit Suisse Global Investment Returns Yearbook 2017

PwC's DDM analysis is based on dividend growth assumptions that are far below independent forecasts

PwC's DDM estimates of the TMR, which lie in the range 5.4 to 5.8 per cent,[28] are biased due to errors that PwC makes in its assumptions on short term and long term dividend growth.

Specifically, PwC assumes that FTSE dividends grow in line with short term and long term nominal growth in UK GDP, but provides no basis for its assumption that UK GDP forecast growth rates are a good proxy for investors' expectations of dividend growth rates. There are a number of reasons why this is likely to be a flawed assumption, not least because FTSE companies derive over 70 per cent of their earnings from outside of the UK, where forecast GDP growth is higher than the

UK.[29] We also note that UK GDP forecast growth rates in the short term are somewhat depressed (due to factors like Brexit) and are substantially lower than independent analyst forecasts of dividend growth rates for FTSE stocks, which are used by the Bank of England to forecast short term dividend growth in its DDM.[30] Overall, PwC's estimates of the DDM of 5.4 to 5.8 per cent are far below independent estimates by the Bank of England and Bloomberg of around 7 to 8 per cent, as reported in Figure 3 above.

The sensitivity of the DDM results to assumptions on dividend growth provides the main reason for relying on long run realised returns as the basis for estimating the TMR, and the use of DDM only as a cross-check.

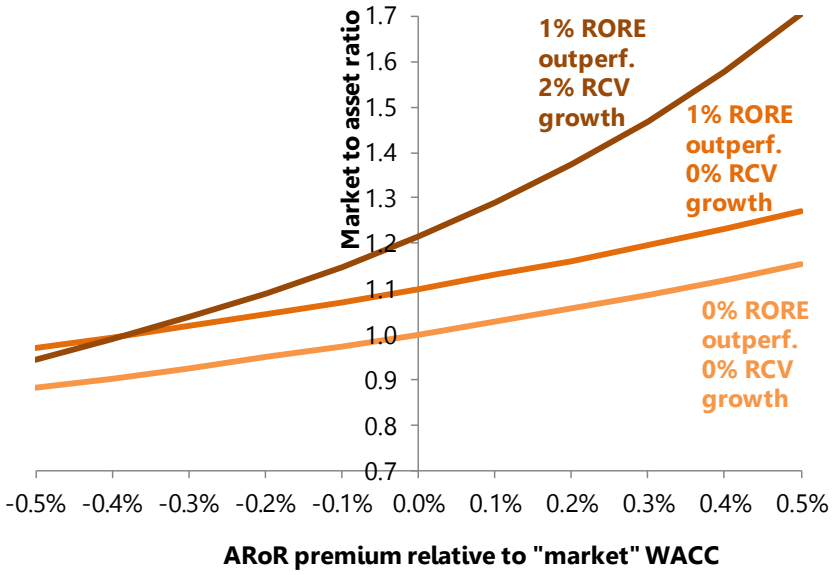
MARs do not provide a reliable method to back-out the TMR, and provide no evidence of a decline in the TMR

In setting out its range for the TMR of 5.1 to 5.5 per cent, PwC also draws on its analysis of market-to-asset ratios for listed UK water companies. However, PwC's analysis simply reinforces the established reasons for not relying on MAR evidence, notably the difficulty in backing-out the cost of equity from other factors that lead to MARs greater than 1.

For example, in calculating MARs, PwC fails to adequately adjust for important drivers of water companies' valuations, including value of non-regulated activities, value of regulated activities unrelated to wholesale, value of pension deficit/surplus, as well as expected outperformance. The value of these adjustments is subject to a large degree of uncertainty, but evidence from independent analyst reports suggests that the RCV premium calculated by PwC is fully explained by these factors,[31] and there is therefore no evidence that the "adjusted" MAR for listed water companies is different from 1.

For example, as we illustrate in Figure 6, assuming expected RORE outperformance of 1 per cent and 2 per cent real RCV growth, as supported by empirical evidence,[32] these two factors alone can explain an observed MAR of around 1.2.

Figure 6. **Outperformance and RCV growth can explain observed water industry MARs**



Source: NERA illustration assuming ARoR=3.74% and 62.5% gearing

Even if we were to accept PwC's calculation of the "adjusted" MAR for listed UK water companies of around 1.1[33] (which we do not), PwC's calculations include two methodological errors, confusing real and nominal terms, and ignoring real growth in the RCV, which lead to PwC substantially understating the implied TMR.

Conclusions

We find that estimates of the TMR based on long run historical averages and DDM have not declined, and therefore do not support a decline in the allowed cost of equity relative to RIIO-1 (or PR14), in contrast to Ofgem and Ofwat's opening thoughts on the prospects for the allowed cost of equity at the forthcoming price controls. We also show that MAR analysis does not provide any evidence that the allowed cost of equity is higher than companies' equity financing costs.

Notes

[1] Ofgem (July 2017), Open letter on the RIIO-2 Framework, Link: https://www.ofgem.gov.uk/system/files/docs/2017/07/open_letter_on_the_riio2_framework_12_july_final_version.pdf

[2] PwC (June 2017), Refining the balance of incentives. Link: https://064f1d25f5a6fb0868ac-0df48efcb31bcf2ed0366d316cab9ab8.ssl.cf3.rackcdn.com/wp-content/uploads/2017/07/PwC-Balance-of-incentives-June2017.pdf

[3] Ofgem (July 2017), op. cit., p.8; Ofwat (July 2017), Delivering Water 2020: Consulting on our methodology for the 2019 price review, Appendix 13: Aligning risk and return, pp.17-18. Link: https://064f1d25f5a6fb0868ac-0df48efcb31bcf2ed0366d316cab9ab8.ssl.cf3.rackcdn.com/wp-content/uploads/2017/07/Appendix-13-Risk-and-return.pdf?v=1.1

[4] See for example Ofgem (September 2012), Consultation on the strategy for the next electricity distribution price controls – RIIO-ED1 – Financial issues, para 2.33. Link: https://www.ofgem.gov.uk/sites/default/files/docs/2012/09/riioed1sconfinancialissues.pdf

[5] The implied allowed equity beta for energy networks at the RIIO-1 controls was between 0.9 and 0.95. Source Ofgem (December 2012), RIIO-GD1: Final Proposals – Finance and uncertainty supporting document, p.22, Link: https://www.ofgem.gov.uk/ofgem-publications/48156/3riiogd1fpfinanceanduncertainty.pdf; Ofgem (December 2012), RIIO-T1: Final Proposals for National Grid Electricity Transmission and National grid Gas – Finance Supporting document, p.24, Link: https://www.ofgem.gov.uk/ofgem-publications/53602/4riiot1fpfinancedec12.pdf

[6] Mason, Miles and Wright (2003), A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K., p.4. Link: https://www.ofgem.gov.uk/ofgem-publications/50794/2198-jointregscoc.pdf

[7] See for example Ofwat (January 2014), Setting price controls for 2015-20 - risk and reward guidance, section A1.4, Link: https://www.ofwat.gov.uk/wp-content/uploads/2015/11/gud_tec20140127riskreward.pdf or Ofgem (February 2014), Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls, Link: https://www.ofgem.gov.uk/ofgem-publications/86366/decisiononequitymarketreturnmethodology.pdf

[8] CMA (March 2014), NIE Limited price determination, p. 13-16, para. 13.82. Link: https://assets.publishing.service.gov.uk/media/535a5768ed915d0fdb000003/NIE_Final_determination.pdf

[9] PwC (2017) Refining the balance of incentives, pp. 78-79

[10] See e.g. Ofwat (January 2014), op.cit., section A1.4, Ofgem or CMA (March 2014), op.cit., para 13.137.

[11] See for example: (1) Campbell and Cochrane (1999), By force of habit: A consumption-based explanation of aggregate of stock market behaviour, Journal of Political Economy, 107, 205-51; (2) Wright, S. et al. (September 2006), Report on the Cost of Capital – provided to Ofgem, Smithers & Co Ltd; (3) Harris, Robert, and Marston, Felicia (1999) , The Market Risk Premium: Expectational Estimates Using Analysts' Forecasts, Darden Business School Working Paper No 99-08; (4) Maddox, F., D. Pippert and R. Sullivan (1995), An Empirical Study of ex ante Risk Premiums for the electric Utility Industry," Financial Management, 89-95.

[12] See for example: (1) Graham and Harvey (2010), The equity risk premium in 2010. (2) Cochrane and Piazzesi (2008), Decomposing the yield curve, Graduate School of Business, University of Chicago. Working Paper; (3) Wright, Mason, Miles (2003), A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK, Smithers & Company Limited.; (4) Scruggs (1998), Resolving the puzzling intertemporal relation between the market risk premium and conditional market variance: A two-factor approach. The Journal of Finance, 53(2), 575-603.; (5) Siegel W(1998), Stocks for the Long Run McGraw Hill, Second Edition.

[13] Siegel (1998), Stocks for the Long Run. McGraw-Hill, second edition, p.11, 13.

[14] See for example, Bank of England, (August 2016), Inflation Report, p.2, Link: http://www.bankofengland.co.uk/publications/Documents/inflationreport/2016/aug.pdf, which states: *""There remains, however, substantial uncertainty about the nature of the UK's future trading arrangement and the implications for competitiveness. This may have increased the risk premium required by investors to hold sterling-denominated assets."*

[15] Deutsche Bundesbank, (November 2007), Monthly Report, p.42. Link: https://www.bundesbank.de/Redaktion/EN/Downloads/Publications/Monthly_Report/2007/2007_11_monthly_report.pdf?__blob=publicationFile

[16] CMA (March 2014), op. cit., p.13-27, para 13.141

[17] The simple approach calculates the arithmetic mean for successive time periods and there are therefore few observations for long holding periods. For holding periods greater than 1 year, the simple approach first calculates the average n-period compound return (e.g. for a 5-year holding period, it calculates the average 5-year compound return earned in the consecutive periods 1-5, 6-10, 11-15 etc.), and then calculates a simple average of the n-period compound returns. The overlapping approach is identical other than it allows for overlapping time periods, e.g. the average compound 5-year return is calculated for periods 1-5, 2-6 etc. The Blume adjustment takes a weighted average of the arithmetic and geometric returns, and the JKM is a statistical approach that provides efficient estimates for small samples, but this adjustment also effectively produces unbiased estimates of the n-period return as a weighted average of the geometric and arithmetic averages over the observation period.

[18] We present Bank of England DDM estimates for December 2016 and 5 year average to December 2016 consistent with PwC's time period for its own DDM estimates.

[19] Again, depending on the time period chosen. See note 18.

[20] On a similar theme, in its RIIO-2 Open letter, Ofgem notes that the expected return needs to "align with current market conditions". Source: Ofgem (2017) op. cit.,p.8.

[21] PwC (June 2017), op. cit., Appendix B, Figure 24, p.80.

[22] PwC (June 2017), op. cit., Appendix B, p.80.

[23] Ofwat (July 2017), op.cit, p.10, Figure 3.

[24] The same is also true for the most recent 20- and 30-year averages, which are also not statistically different from the long run average of around 7 per cent.

[25] Dimson, Marsh and, Staunton (February 2017), Credit Suisse Global Investment Returns Yearbook, p.12

[26] DMS (February 2017) Global Investment Returns Yearbook 2017 – Slide Deck, slide 3.

[27] In addition, we observe a similar increase in the average of realised equity returns for France, albeit based on 20Y moving average returns (given 30y moving average series not available for a sufficiently long period of time).

[28] PwC derives a nominal TMR range of 8.3 to 8.8 per cent, equivalent to 5.4 to 5.8 per cent real, assuming 2.8 per cent RPI inflation in line with PwC. Source: PwC (June 2017), op.cit., p.82, 87.

[29] Bank of England (2017), An improved model for understanding equity prices, Quarterly Bulletin 2017Q2, p.91 and Chart 7. Link: http://www.bankofengland.co.uk/Pages/reader/index.aspx?pub=qb17q2article1&page=1

[30] Bank of England (2017), op. cit., p.90.

[31] We take analyst estimates of the different adjustments (non-regulated activities, regulated non-wholesale activities, pension deficit and outperformance) in £m terms and divide them by the analysts' reported RCVs to estimate the implied premium. Our analysis shows the value for these adjustments more than explains the observed MARs. (Source: Societe Generale (March 2016), United Utilities, p.6; Societe Generale (March 2016), Severn Trent, p.2; RBC (October 2016), UK Water: RORE and valuations, p.12; Societe Generale (October 2016), United Utilities, p11; RBC (January 2017), United Utilities Group, PLC, p.3; JPMorgan (May 2017), Severn Trent, p.2; JP Morgan (May 2017), United Utilities, p.2; RBC (July 2017), United Utilities Group PLC, p.4; RBC (July 2017), Severn Trent PLC, p.4.)

[32] For example, SVT and UU Annual Performance Reports show RORE outperformance since the start of PR14 of 2.6 and 1.2 per cent respectively. (Source: Severn Trent (2017), Annual Performance Report Year ended 31 March 2017, p.94, Link: https://www.stwater.co.uk/content/dam/stw/apr/STW-Annual-Performance-Report-2017-(FINAL).pdf and United Utilities (2017), United Utilities 2016/17 Annual Performance Report, p.130, Link: https://www.unitedutilities.com/corporate/about-us/performance/annual-performance-reports-2015-2020/). RCV growth of 2 per cent in real terms is consistent with average growth in RCV over the last four price control periods. (Source: Ofwat (September 2005), Financial performance and expenditure of the water companies in England and Wales 2004-05 report, Table 9, p31; Ofwat (2010), Financial performance and expenditure of the water companies in England and Wales 2009-10, Table 9, p19; Regulatory capital value update 2009-10 and 2014-15, Link: http://www.ofwat.gov.uk/publications/regulatory-capital-value-updates/)

[33] PwC (June 2017), op. cit., Appendix B, p.86.

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Contacts

For further information and questions, please contact the authors:

Dr Richard Hern
Managing Director
+44 20 7659 8582
Richard.Hern@nera.com

James Grayburn
Associate Director
+44 20 7659 8572
James.Grayburn@nera.com

Zuzana Janeckova
Consultant
+44 20 7659 8574
Zuzana.Janeckova@nera.com

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